one kind of flower. For example, the rose was some flower with a bulbous root—tulip, narcissus, crocus of amaryllis—probably a general term including all of these; the lily of the field, as already mentioned, was an anemone (*Anemone coronaria*), but possibly included all the wild flowers blooming on the hillsides; apples were apricots, quinces or oranges; the gourd that shaded Jonah may have been a vine of the gourd family, though many students believe it to have been the castor bean. Of course, for many of the plants named there is no doubt as to the species—the Cedar of Lebanon, olive, fig, green bay, palm, and some of the spices and plants used for perfumes or in making incense.

The book will be of great value to those who desire to devote a part of their gardens to these plants of such sacred memories, to all students of the Bible and to plant lovers generally. The dozen full page plates illustrate a few of the plants and give some suggestions for flower arrangements that combine beauty with religious significance.

George T. Hastings

An Individual Botany Text

Work Book in General Botany. By H. C. Sampson. Harper & Brothers, New York, 1941. 242 looseleaf pages. $1.75.

The subtitle of this publication is "A problem approach to plant science through observation and discussion." This, perhaps as well as any single phrase, can be used to describe the method of instruction in the beginning course at Ohio State University under the immediate supervision of Professor Sampson. It is inevitable that many teachers of elementary botany may look with some disfavor on this guide for it can scarcely be said to follow traditional lines. It is therefore necessary that a little of its background be reviewed.

There has been much discussion concerning the method of instruction followed in that institution. In the first place, the beginning student is not assigned a chapter in a book and told to return the next day and "recite his lesson." Also, there is no differentiation between lecture and laboratory sessions, for the students meet in the same room with their instructor one hour a day, five days a week. This provides the necessary continuity of topic and concept so sadly lacking in many courses; it also establishes firm contact between

teacher and student. And it is this contact which permits freedom of discussion.

It has been said, and with truth, that the method of instruction at Ohio State is "a discussion in the presence of the material." The lesson, then, begins with a consideration of the problem. This is followed by a study of pertinent material, interspersed with discussion leading to primary conclusions and these, ultimately, to broader biological generalizations. In recording his observations and conclusions, the student thus personally accumulates a basic textbook of botany. It is obvious that many items, especially of a theoretical or extended nature, or requiring too precise experimentation, cannot be observed or discussed during the study period. For these the orthodox text[1] is assigned, as well as supplementary reading. In this way the student is prepared for a further adventure into the general subject of botany; at least he has been given some insight into the methods of scientific reasoning based on experimental procedures. Thus, by seeing, doing, recording and discussing, the student learns the same facts he might otherwise memorize from a book. However, at the same time he also acquires the habit of gathering and evaluating evidence, a mental trait which certainly cannot be cultivated by the other method.

There has been considerable argument that the use of a set of drawings, complete except for the labels, does not cultivate the student's powers of observation. The writer of these notes is able to take issue with this viewpoint for he instructed at Ohio State University during the decade of transition from the old to the new type of instruction and watched the method develop with considerable interest, particularly as it influenced student reaction. In selected classes having paired IQ ratings there was no decrease in effective learning where prepared drawings were used. The advantage is that they eliminate a lot of useless "busy work" which wastes time which might more effectively be spent in examining the material or in discussion. However, the instructor should be cautioned that prepared drawings can never take the place of the actual material and that the student must learn to study the material first, using the diagrams or detailed drawings as a means of recording his observations.

[1] Textbook of Botany. By Transeau, Sampson and Tiffany. Harper & Brothers. New York, 1940.

Therefore, regarding the use of unlabeled drawings such as are an integral part of the Work Book, it should long ago have been obvious that careful observation and accurate recording of scientific information have but little in common with artistic ability. It has been one of the major crimes of our biology teaching that we have continued to penalize the student who is not congenitally an artist. The argument that the professional botanist should be able to draw, and therefore must learn in the beginning course, is certainly a fallacy. Those who advocate this doctrine have somehow forgotten that it is not the function of the introductory course to create professional botanists but to teach botany. It is very doubtful if a group of students—sounding for all the world like woodpeckers on a tin roof as they vainly try to "stipple in the cytoplasm" with hard pencils—are learning very much about the structure of protoplasm.

It would seem that I am defending Sampson's Work Book. This is unnecessary for it can stand on its own merits. But there are some who further object to it on the ground that it contains too much material, that they would not have time to cover all of it in a full year. In general these are the same teachers who admit that they assign a chapter in the text and then "hold the student responsible for every word." It is admitted that the Work Book does contain numerous questions, but it should be obvious that it was not the intention of its author and his collaborators that all of them be answered. Certainly many of them were introduced for the sole purpose of arousing discussion and to indicate the limits of our present knowledge, as well as the need for more research before the question can adequately be answered. It is perhaps a healthy mental attitude to instill in the beginning student; he should early realize that the science of plants is not a closed subject and that much yet needs to be done.

There is also considerable complaint by some that the course does not contain sufficient "morphology." This unquestionably results from the fact that the Work Book is not divided into sections labeled "physiology" and "morphology." There may be some lack of delving into the more obscure of the "life histories" but the course actually contains considerably more real morphology than is at first apparent—probably more than most courses—for it is integrated with the functional activity of plants, as it should be.

There is perhaps one drawback to a wider adoption of the course as outlined in the Work Book. To teach it successfully, it is neces-

sary that the instructor have a fundamentally broad training in the field of botany; he cannot be a beginning graduate student interested primarily in getting his degree, with his teaching a bothersome chore to be sandwiched in at odd hours. He must know that the educator, if he aspires to be worthy of the real meaning of the word, must do more than stand in front of a group of students droning over phrases which he has hastily snatched from a book a few minutes before class time—and from the same text the students were supposed to have "studied" the night before. The philosophical background of the course has led to an organization designed to awaken in the student an intelligent awareness of the nature of living organisms through a study of plants. Under the guidance of a competent and sympathetic instructor, this can be accomplished.

New York Botanical Garden
New York, N. Y.
W. H. Camp

FIELD TRIPS OF THE CLUB

Trip of November 2, 1941, Along the Appalachian Trail

Ten members and guests were present on this trip whose purpose was to continue the botanical survey and census being made by the Club of the New Jersey sections of the Appalachian Trail maintained by the New York-New Jersey Trails Conference. In the morning we covered the Dunfield Creek route from the Delaware River to Sunfish Pond (Section 1a) and in the afternoon the blazed route from Sunfish Pond back to the Delaware River (Section 1), covering slightly over nine miles of trail in all. The weather was intensely cold.

According to the official records in Dr. Small's office there have been identified thus far by Club members in Section 1 166 species and varieties of spermatophytes, 11 pteridophytes, 4 bryophytes, 8 fungi, and 24 lichens. In Section 1a there have been found 159 species and varieties of spermatophytes, 17 pteridophytes, 15 bryophytes, 18 fungi, and 39 lichens. The total number of different species and varieties from both areas taken together is as follows: spermatophytes, 238; pteridophytes, 19; bryophytes, 17; fungi, 22; and lichens, 43.

Among the most interesting plants observed by us on our trip through Section 1a were the American dittany (*Cunila origa-*